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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/050,539	01/18/2002	Sunao Ishizaki	NA04	7739

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EXAMINER

NGUYEN, LAM S

ART UNIT PAPER NUMBER

2853

DATE MAILED: 04/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

10/050,539

Applicant(s)

ISHIZAKI, SUNAO

Examiner

LAM S NGUYEN

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 April 2004.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5,7 and 8 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1,3,5,7 and 8 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 18 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 7-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Hiwada (US 6068360).

Hiwada discloses a drive circuit for an ink jet head of a serial type ink jet printer, the ink jet head including a carriage, nozzles, and pressure generating chambers filled with ink (FIG. 1, element 1), wherein said ink jet head discharges ink droplets from the nozzles by changing volumes of said pressure generating chambers in response to a drive waveform signal applied to piezoelectric actuators (FIG. 6, elements 12) corresponding to said pressure generating chambers while moving said carriage reciprocally in a direction perpendicular to a feeding direction of a printing sheet, said drive circuit comprising:

a control circuit board (FIG. 3, 5, element 4) including a waveform generator generating (FIG. 5, element 41) a signal for driving said ink jet head (FIG. 3, 5, element 1), a power amplifier amplifying the output signal of said waveform generator, an image memory storing printing data, and a data transmitter transmitting image data stored in said image memory as serial data thereon (FIG. 3, 5, element 2);

an intermediate circuit board (FIG. 3, 5, element 3) mounted on said

Art Unit: 2853

carriage, said intermediate circuit board including a data receiver receiving said serial data from said data transmitter, transfer gates (FIG. 6, element 22) selecting piezoelectric actuators on the basis of said received printing data, and a level shifter matching voltage levels from said data receiver to respective transfer gates;

a cable connecting said control circuit board and said intermediate circuit board to each other (FIG. 5, elements 5, 71, 72 or FIG. 3, elements 5); and

a negative feedback loop including a resistor and a capacitor, said negative feedback loop provided between said power amplifier included in said control circuit board and inputs of said transfer gates included in said intermediate circuit board the negative feedback loop feeding back a terminal voltage applied to the piezoelectric actuator to the power amplifier (column 9, line 4-10: "the negative feedback circuit to feedback the voltage at the power supply input terminals" of the switch circuit to the power amplifier).

Referring to claim 8: further comprising a negative feedback loop including a resistor, said negative feedback loop being provided between an output and an input of said power amplifier mounted on said control circuit board (FIG. 3: the feedback 70 is provided between the output of power amplifier C and the input of the power amplifier through resistor 7).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Art Unit: 2853

2. Claims 1, 3, 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiwada (US 6068360) in view of Ishizaki (EP 0995599 A2).

Hiwada discloses a drive circuit for an ink jet head having nozzles, pressure generating chambers filled with ink to be discharged from said nozzles and piezoelectric actuators (FIG. 6, element 12) corresponding to respective pressure generating chambers, said ink jet head discharging ink droplets from said nozzles by changing volumes of said pressure generating chambers in response to a drive waveform signal applied to said piezoelectric actuators, said drive circuit comprising:

- a waveform generator (FIG. 5, element 42) generating said drive waveform signal;

- a power amplifier (FIG. 4, element 41) amplifying said drive waveform signal supplied to a first input of said power amplifier and outputting said drive waveform signal to said piezoelectric actuators via an electrical connection having a first end coupled to the power amplifier and a second end coupled to the piezoelectric actuator (FIG. 5, element 5 and column 9, line 4-5: “power supply conductors connecting the power amplifier and the switch circuit for the electric power supply”);

- a feedback loop having a resistor (FIG. 1, element 7) and feeding a terminal voltage at the second end of the electrical connection applied to said piezoelectric actuators back to a second input of said power amplifier (column 9, line 4-10: “the negative feedback circuit to feedback the voltage at the power supply input terminals” of the switch circuit), wherein the terminal voltage is fed via the resistor (FIG. 1).

Hiwada does not disclose wherein the feedback loop having a capacitor connected in parallel with the resistor.

Ishizaki discloses an ink jet printer having a signal generating circuit and a power amplifier (FIG. 1, elements 38a and 39a) to provide driving signals to piezoelectric actuators (FIG. 1, element 21) of an ink jet printhead and a feedback loop including a resistor and a capacitor connected in parallel with the resistor (FIG. 9, elements C11 and R24) to feedback the voltage of the driving signals to control the power amplifier (FIG. 1, element 39a).

Therefore, it would have been obvious for one having ordinary skill in the art at the time the invention was made to modify the printing system disclosed by Hiwada such that including a capacitor that is connected in parallel with the resistor as disclosed by Ishizaki. The motivation doing so is to configure “a negative feedback unit which gives a negative feed-back to the operational amplifier so as to hold an output voltage of the waveform generating means to a zero potential before starting and after termination of printing” as taught by Ishizaki (column 3, line 57 to column 4, line 5).

Response to Arguments

Applicant's arguments with respect to claims 1, 3, 5 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's arguments filed 04/06/2004 referring to claims 7-8 have been fully considered but they are not persuasive.

Regarding to the arguments on page 9: The applicants argued that Hiwada fails to disclose the negative feedback loop feeding back a terminal voltage applied to the piezoelectric

Art Unit: 2853

actuator to the power amplifier. However, as discussed above Hiwada discloses the above limitation. Therefore, the argument is not persuasive.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAM S NGUYEN whose telephone number is (571)272-2151. The examiner can normally be reached on 7:00AM - 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, STEPHEN D MEIER can be reached on (571)272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2853

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LN
April 14, 2004



HAI PHAM
PRIMARY EXAMINER